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RESEARCH ARTICLE

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Global and Regional IUCN Red List Assessments: 5

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Abstract

In this contribution, the conservation status of four vascular plants according to IUCN categories and criteria are presented. It includes the assessment of *Arceuthobium oxycedri* (DC.) M.Bieb., *Ionopsidium albiflorum* Durieu, *Trifolium latinum* Sebast., and *Vicia incisa* M.Bieb. at a Regional level (Italy).

Keywords

conservation, extinction risk, IUCN protocol, threats

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How to contribute

The text of the global and regional assessment should be submitted electronically to Simone Orsenigo (simone.orsenigo@unimi.it) or to Giuseppe Fenu (gfenu@unica.it); text up to 8000 characters in length (space included) must include a distribution map and a picture of the assessed species.

Red List assessments

Arceuthobium oxycedri (DC.) M.Bieb.

Regional Assessment (Italy)
Taxonomy and nomenclature
Order: Santalales *Family:* Santalaceae

Arceuthobium oxycedri (DC.) M.Bieb., Fl. Taur.-Caucas. 3: 629. 1820

Common name: vischio del ginepro (It), juniper dwarf mistletoe (En)

Geographic distribution range: *Arceuthobium oxycedri* (Fig. 1) is present in many countries bordering the Mediterranean Sea, in the Caucasus and central Asia (in many former Soviet republics), in the Indian subcontinent, and in western China (Ciesla et al. 2002). In Italy, *A. oxycedri* has been reported from several sites, all close to each other and located in a small area between eastern Toscana and western Marche, in the Provinces of Arezzo (nine localities) and Pesaro/Urbino (six localities) (Brilli-Cattarini and Gubellini 1983, Gonnelli and Scarponi 2003; Fig. 2).

Distribution: countries of occurrence: Afghanistan, Azerbaijan, Algeria, Albania, Armenia, Bosnia-Herzegovina, Bulgaria, China, Croatia, Cyprus, France, Georgia, Greece, India, Iran, Iraq, Italy, Kyrgyzstan, Lebanon, Macedonia, Montenegro, Morocco, Pakistan, Portugal, Russia, Serbia, Slovenia, Spain, Syria, Tajikistan, Tunisia, Turkey, Turkmenistan, Ukraine, and Uzbekistan.

Biology: *Plant growth form:* woody perennial epiphyte, obligate parasite on *Juniperus* sp. pl. and other taxa belonging to Cupressaceae (in Italy only on *Juniperus communis* L., *J. oxycedrus* L. and *J. deltoides* R.P.Adams). Dwarf mistletoe shoots have chlorophyll, but with no photosynthetic significance (Hawksworth and Wiens 1996, Hawksworth et al. 2002).

Flowering time: late summer-early autumn (September to October).

Reproduction: *Arceuthobium oxycedri* is a dioecious plant that only reproduces from seeds. Dispersal is promoted by the hydrostatic contraction of a mature fruit that propels a single, small seed upon ballistic flight to a near location, where a host may be inoculated. The dwarf mistletoes rely almost exclusively on this ballistic mechanism; however, birds and mammals may be important, for the rare, long-distance dissemination of seeds (Hawksworth and Wiens 1996, Hawksworth et al. 2002). The dwarf

Figure 1. *Arceuthobium oxycedri* in Toscana. Picture by V. Gonnelli.

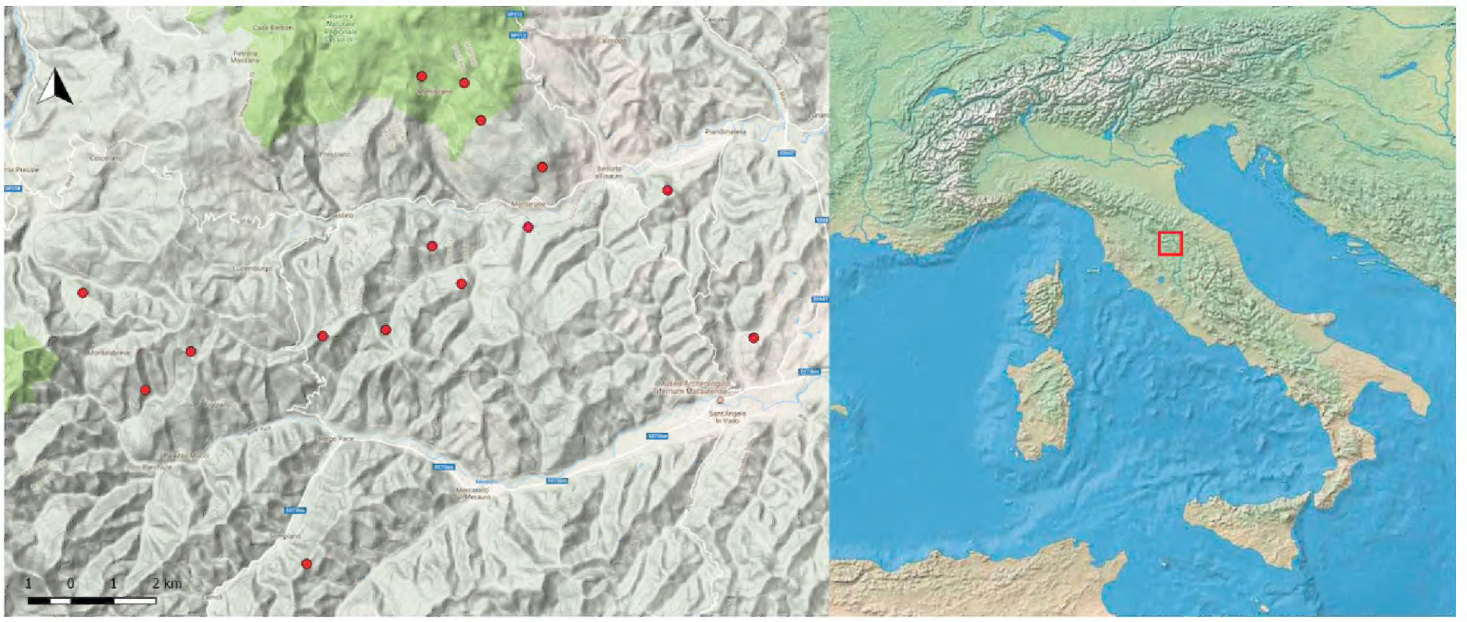

Figure 2. Geographic range and distribution map of *Arceuthobium oxycedri* in Italy.

mistletoe does not produce shoots until two or three years following infection and flower production requires four or five years. Detailed information concerning establishment, reproduction, and seed germination are reported in Hawksworth and Wiens (1996), Hawksworth et al. (2002), and Krasylenko et al. (2017).

Habitat and ecology: *Arceuthobium oxycedri* habitat and ecology depend strictly on the host on which it lives. In Italy, it grows on *J. communis*, *J. deltoides*, and *J. oxycedrus* individuals located in open and degraded mixed oak woods and in shrubby grasslands, on marly-arenaceous and clay-calcareous soils, at altitudes between 500 and 1000 m a.s.l. (Gonnelli and Scarponi 2003). Shrubby grasslands on which *A. oxycedri* can be found in Italy generally correspond to the habitat "*Juniperus communis* formations on heaths or calcareous grasslands" (code 5130) of the Habitat Directive 92/43/EEC.

Population information: for Italy, there is no detailed information available on quantitative population estimation or on population dynamics and trends.

Threats: 2.3.2 *Small-holder grazing, ranching or farming*. Shepherds and farmers sometimes cut junipers (hosting *A. oxycedri* of which they are unaware) to improve pastures.

7.3 *Other ecosystem modifications*. The agro-pastoral and forestry activities that degrade the mixed oak woods in which *A. oxycedri* lives are abandoned in some areas, for socio-economic reasons; this increases the tree cover and reduces the possible occurrence of junipers (which are rather heliophilous) within woods, consequently also of *A. oxycedri*. Currently, the absence of targeted management leads to the reduction of suitable sites for the persistence of the species; therefore, a decline in AOO, habitat quality, and number of individuals can be expected.

CRITERIA APPLIED:

Criterion B: **EOO:** 101.6 km^2 calculated with minimum convex hull in QGis 2.14
AOO: 60 km^2 calculated with a 2 × 2 km cell fixed grid

a) Number of locations: two locations have been identified according to threats 2.3.2 and 7.3. At present, four sites are not subjected to any threat, but any change in grazing

control or management could have negative impacts on all the growing sites within the same administrative region.
b) Decline in EOO (i), AOO (ii), quality and extent of habitat (iii), number of subpopulations (iv).

Red List category and Criteria (Regional Assessment)

EN	**Endangered**	**B1ab(i,ii,iii,iv) + B2ab(i,ii,iii,iv)**

Rationale for the assessment: *Arceuthobium oxycedri* is widespread especially in central Asia, but in Italy it is found only in a few sites, all close to each other and located in a small area between eastern Toscana and western Marche. AOO and EOO are rather small and the Italian population is threatened by the abandonment of agro-pastoral and forestry activities in some locations and the intensity of agro-pastoral activities in others. Due to the dispersal and reproduction mechanisms, the Italian populations are isolated from the populations of other countries and the loss of some local subpopulations cannot be easily recovered. For these reasons, this plant can be considered Endangered at a Regional level (Italy).

Previous assessment: *Arceuthobium oxycedri* was not previously evaluated (NE) at Regional level for Italy, while it was assessed as Least Concern (LC) at global level (IUCN 2007).

Conservation actions: *Arceuthobium oxycedri* is not protected at either regional, national or international levels. The Italian sites are not included in any protected area.

Conservation actions needed: further monitoring and research activities are recommended in order to better understand the population trends of the species in Italy.

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Ionopsidium albiflorum Durieu

Regional assessment (Italy)
Taxonomy and nomenclature
Order: Brassicales *Family:* Brassicaceae

Ionopsidium albiflorum Durieu Rev. Bot. Recueil Mens 2: 433 (1847) ≡ *Bivonaea albiflora* (Durieu) Prantl in Engler & Prantl, Nat. Pflanzenfam. 3(2): 166 (1891) ≡ *Pastorea albiflora* (Durieu) Tod. in Bertoloni, Fl. Ital. 10: 520 (1854).

Common name: White diamond flower (En)

Geographic distribution range: *Ionopsidium albiflorum* (Fig. 3) is distributed in the southwestern Mediterranean Basin. Italian populations represent the northeastern limit of its range. In Italy, it is reported in Puglia, Basilicata and Sicilia, while its occurrence in Toscana is doubtful (Bartolucci et al. 2018). In Puglia, it has been observed in the fol-

Figure 3. *Ionopsidium albiflorum* photographed in Santeramo in Colle (Bari). Picture by E.V. Perrino and G.N. Silletti.

lowing localities: between Masseria Plantamura and Bosco di Morazia (Perrino et al. 2013), and at Masseria Simone (*25.4.2015, E.V. Perrino, G.N. Silletti, 40491, BI*), both located in the Santeramo in Colle (Bari) municipality; Martina Franca (Bari) (Silletti 2013); Parco del Conte (*18.1.1897, 31.1.1898, 23.2.1898, A. Palanza, 44390, BI*), Bosco Caputi (*14.2.1897, 15.2.1899, A. Palanza 44389, BI*) in the municipality of Ruvo di Puglia (Bari), Bosco Scacchiavolpe (*21.2.1897, A. Palanza, 44390, BI*) in the municipality of Cassano Murge (Bari) (Palanza 1900); Bosco Acquara in the municipality of Orsara di Puglia (Foggia) (Trotter and Romano 1914). The presence in the stations of Parco del Conte, Bosco Caputi, Bosco Scacchiavolpe, and Bosco Acquara is no longer confirmed. In Basilicata, the species was observed only in the Regional Park of "*Murgia Materana*" (Matera) (Medagli and Gambetta 2003). In Sicilia, it is reported in four localities in the province of Palermo, three of them by Lojacono-Poiero (1888-1908) have not been recently confirmed: Alpe Cucco and Bosco del Cappelliere, in the municipalities of Godrano and Marineo, respectively; Nicolosi in the municipality of Lercara Friddi. The fourth site (Marcenò et al. 1985) refers to Cozzo Padorno on Mt. Sicani in the municipality of Prizzi. Only the five sites recorded in the last 35 years have been used for the assessment, excluding the other seven for which there has been no confirmation for more than 100 years (Fig. 4).

In Toscana, its presence should be considered highly doubtful, because the only known herbarium specimen is very old and was collected as *I. savianum* (Caruel) Arcang. (originally determined as *Bivonaea saviana* Caruel by *Forsyth Major* in April 1883, from Mt. Calvi), and then revised in a genetic study as *I. albiflorum* Durieu (Koch 2012).

Distribution: Countries of occurrence: Algeria, Italy, Morocco, and Tunisia

Biology: *Plant growth form:* annual (therophyte)

Flowering time: from March to April

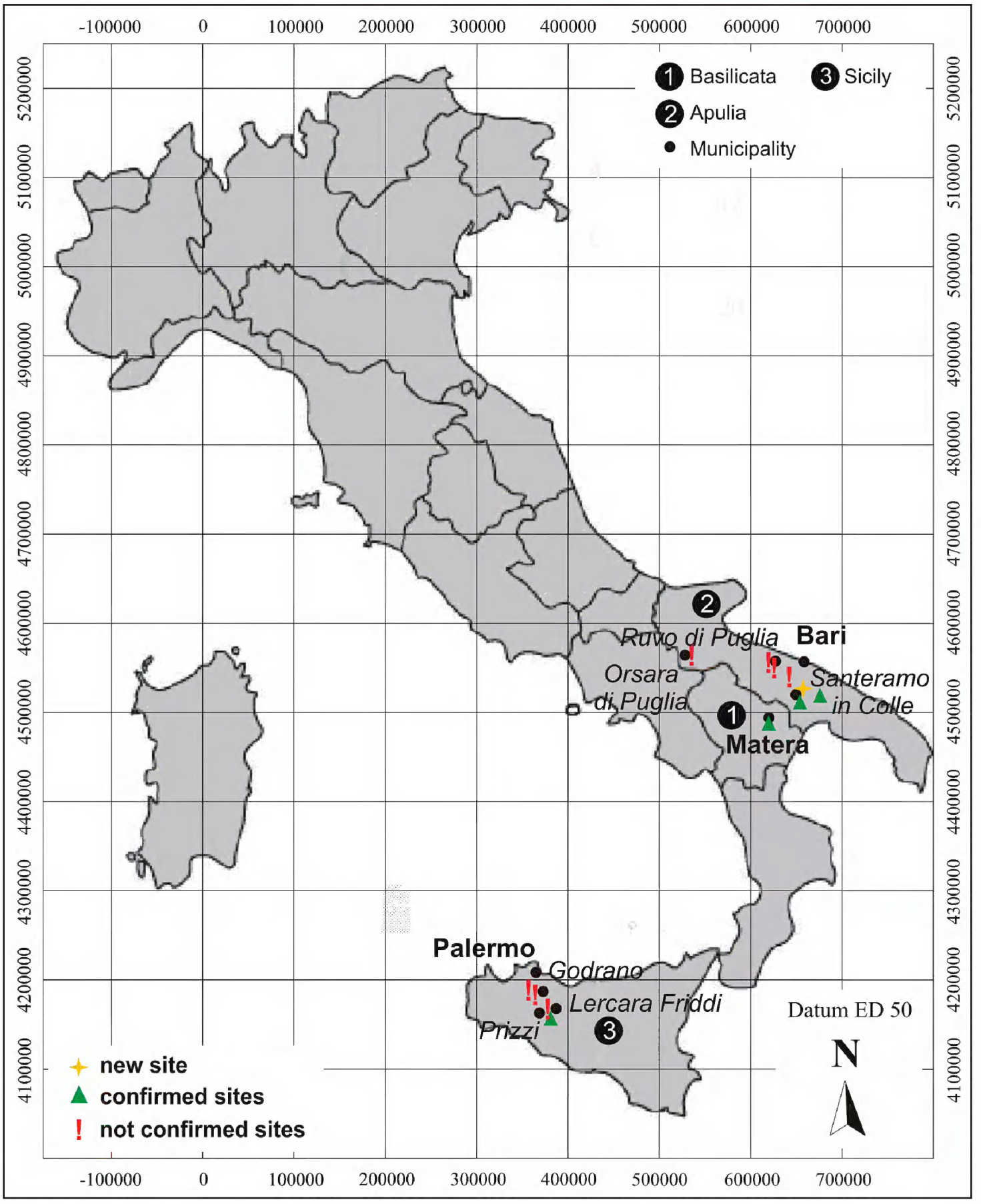

Figure 4. Geographic range and distribution map of *Ionopsidium albiflorum* in Italy.

Reproduction: no information on pollination strategy and seed germination is available.

Habitat and Ecology: *Ionopsidium albiflorum* typically grows on uncultivated meadows up to about 800 m a.s.l.

Population information: There is no detailed information available on population dynamics. It is noteworthy that the 30 individuals observed in the spring of 2009

between Masseria Plantamura and Bosco di Morazia, despite the absence of anthropogenic disturbance, were not observed in the following two years, and reappeared only in 2012 with a few individuals. The second site, Santeramo in Colle (Masseria Simone), is probably the most representative Italian subpopulation, counting more than 1,000 individuals in only 200 m^2.

Threats: *6.1. Recreational activities*: in some cases, an increased intensity of human trampling could negatively affect the small populations observed.

7.3 Other ecosystem modifications: changes in natural land use to agriculture or reforestation would lead to the loss of the habitat of the species.

9.3.3. Herbicides and pesticides: in the sites near crop fields.

CRITERIA APPLIED:

Criterion B: **AOO:** 20 km^2 calculated with a 2×2 km cell fixed grid
EOO: 8,794 km^2 calculated with minimum convex hull (with Google Earth Pro)

a) Number of locations: four (according to threat 7.3)
b) Documented decline in EOO (i), AOO (ii), number of subpopulations (iv)
c) Extreme fluctuations in number of mature individuals (iv)

Red List category and Criteria (Regional Assessment)

EN	**Endangered**	**B2ab(i,ii,iv)c(iv)**

Rationale for the assessment: in Italy, *I. albiflorum* is found in Puglia, Basilicata, and Sicilia. It has an AOO of 20 km^2, four locations have been identified, a decline has been documented in EOO, AOO, and number of subpopulations, and extreme fluctuations in number of mature individuals have been observed. Therefore, it is classified as Endangered.

Previous assessment: At a Regional level, the species was assessed as Critically Endangered (CR) in Puglia, Endangered (EN) in Sicilia, and Vulnerable (VU) in Basilicata (Conti et al. 1997). No assessment at global level of the species exists (IUCN 2017).

Conservation actions: The sites, except that of Masseria Simone and Parco del Conte, are included in the following protected areas: National Park of "*Alta Murgia*", SAC/SPA IT9120007 "*Murgia Alta*", SAC IT9110032 "*Valle del Cervaro Bosco dell'Incoronata*" (Puglia), SAC/SPA IT9220135 "*Gravine di Matera*", Regional Park of the "*Murgia Materana*" (Basilicata), SPA ITA020048 "*Monti Sicani, Rocca Busambra e Bosco della Ficuzza*", SAC ITA020031 "*Monte d'Indisi, Montagna dei Cavalli, Pizzo Pontorno e Pian del Leone*" (Sicilia). Currently, there are no conservation actions for this extremely rare species.

Conservation actions needed: It would be useful to start *in situ* and *ex situ* conservation actions, in addition to research activities on population monitoring in all Italian administrative regions where the species is reported, in order to better understand the species' reproductive biology, ecology, level of threat, and population trend.

Enrico Vito Perrino, Robert Philipp Wagensommer,
Alessandro Crisafulli, Giuseppe Nicola Silletti

Figure 5. *Trifolium latinum* photographed in the Decima-Malafede Regional Park (Rome, Italy). Picutre by C. Fratarcangeli.

Trifolium latinum Sebast.

Regional assessment (Italy)

Taxonomy and nomenclature
Order: Fabales *Family:* Fabaceae

Trifolium latinum Sebast. in Plantae Romanae 1, 7 (1813)

Common name: Trifoglio latino (It).

Geographic distribution range: *Trifolium latinum* (Fig. 5) grows in Bulgaria, northern Greece, European Turkey (Kozuharov 1976, Zohary 1970, Zohary and Heller 1984), and Italy, where it was described from a small area in the SW suburbs of Rome (Tenuta dei Massimi) in 1813 (Sebastiani 1813, Sebastiani and Mauri 1818). According to the material in the *Herbarium Romanum*, the species was collected in the same area until the end of the 19th century; it was then believed extinct in Italy (Pignatti 1982, Iamonico et al. 2011) until its rediscovery in a different, but nearby, locality in the Decima-Malafede Regional Park of the Municipality of Rome (Fanelli et al. 2012; Fig. 6). The species was described as rare in the historical record; the current range is also restricted to a small stretch of no more than 50 m in the coppices of *Quercus frainetto* Ten. and *Quercus cerris* L., along a dirt road.

Distribution: Countries of occurrence: Bulgaria, Greece, Italy, European Turkey.

Biology: *Plant growth form*: annual (therophyte).

Flowering and fruiting time: Flowering in May and extending into early June.

Reproduction: Dispersal by seeds. Seeds seem to form a seed bank, since the species re-grew abundantly after the almost total destruction of the population in 2015, but it was not possible to assess the longevity of seeds in soils.

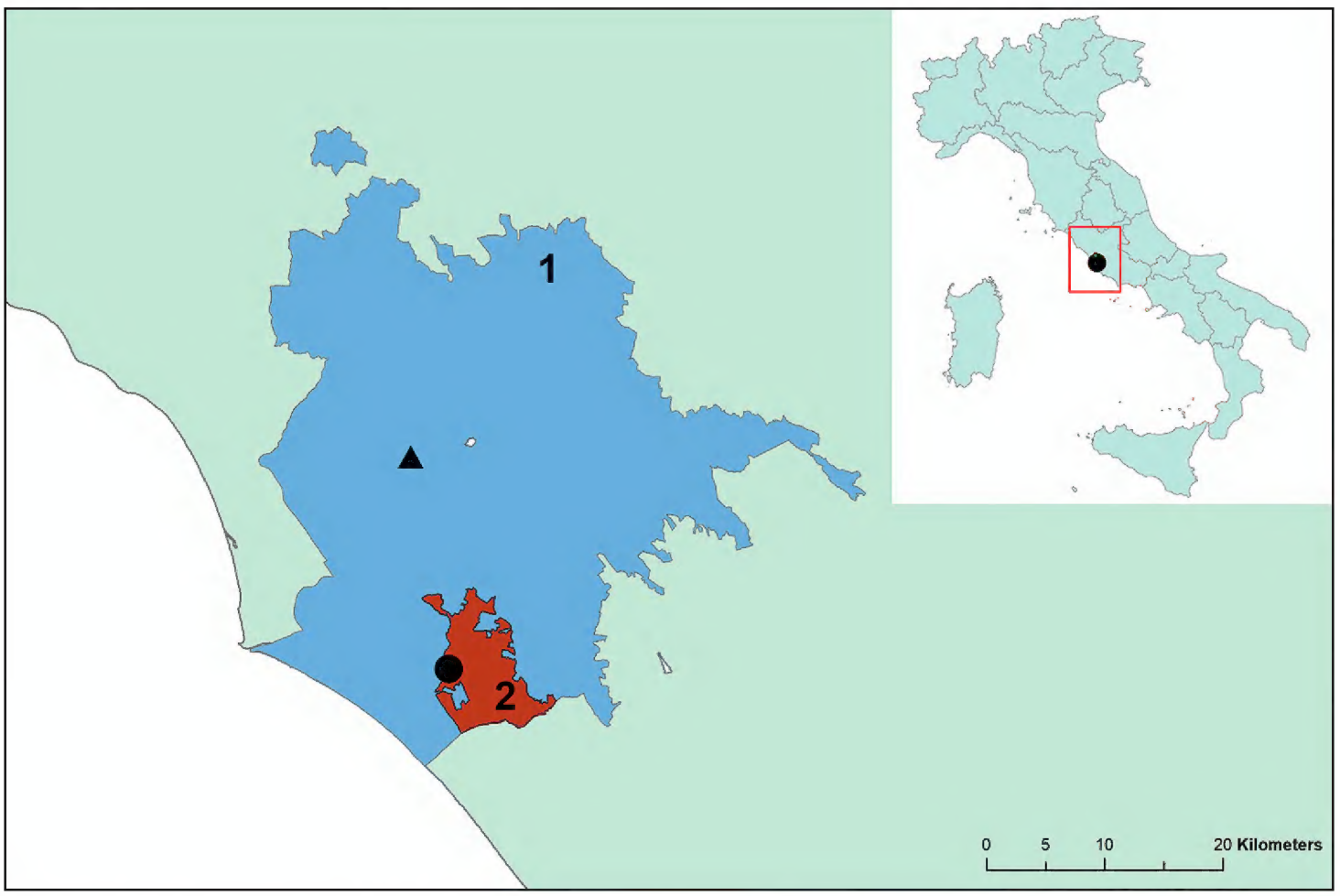

Figure 6. Occurrence of *Trifolium latinum*. The black circle marks the current population; the black triangle indicates the historical site. 1: Municipality of Rome; 2: Decima-Malafede Regional Park.

Habitat and ecology: It grows in the fringes and clearings of sub–Mediterranean deciduous forests dominated by *Quercus cerris-Q. frainetto* in moderate shadow on subacid sandy soils (Fanelli et al. 2012).

Population information: The Italian population was monitored from 2012 onwards. The extent of occurrence is about 60 m^2, whereas the AOO is less than 40 m^2. These seem rather stable due probably to the presence of a persistent soil seed bank. The population is, instead, declining: in 2012 it comprised 391 flowering individuals, in 2013 it was not monitored, 241 individuals were counted in 2014 and in 2015 it was almost exterminated (only three individuals) due to the ploughing of the white road along which the species grows by the owner of the area; it recovered in 2016 (103 individuals) and in 2017 counted 112 individuals. Although the species survived the inconsiderate destruction of its habitat, its population decreased by 71%.

Threats: *7.3 Other ecosystem modification:* the population was almost exterminated in 2015 due to ploughing of the dirt road where the species occurs. This intervention was motivated with the need to prevent fire expansion in the woodland; the risk is still present due to current forestry practices in the area.

11.1 Habitat shifting and alteration: the population seems to be related to a particular microclimate, which could explain the extremely restricted AOO of the population and the absence in apparently suitable and similar habitats in the same area. Climate change can alter these microclimatic conditions, thus decreasing or extinguishing the population.

CRITERIA APPLIED:

Criterion B: **AOO**: 4 km^2 calculated with a 2×2 km cell fixed grid
a) Number of locations: one, since the species occur in a single locality
b) Decline in quality and extent of habitat (iii); the number of individuals is subjected to continuous decline (more than 70%) since its discovery in 2011 (iv).
Criterion D: The number of mature individuals is less than 250 in the years following the species' rediscovery in Italy.

Red List category and Criteria (Regional Assessment)

CR	Critically Endangered	B2ab(iii,iv)

Rationale for the assessment: In Italy, the species is present in a single locality with an AOO of 4 km^2, however the area actually occupied by the species is limited to a few dozen square metres. The ongoing threats to the only known population, the decline in quality of the habitat and the decline in number of mature individuals support classification of the species as Critically Endangered according to the formula B2ab(iii, iv).

Previous assessment: Extinct at the Regional level in Italy (Conti et al. 1992).

Conservation actions: *Trifolium latinum* is not protected under either national or regional laws. The species occurs in the Decima–Malafede Regional Park and in the SCI "Sughereta di Castel di Decima" IT6030053, but the area is privately owned and no specific conservation measures have been applied, even though the Park was immediately informed of the existence of this critically endangered species.

Conservation actions needed: For this population to persist, the habitat must not be altered, which means that the particular microclimate and shading conditions must be preserved. No forestry practice should be allowed in the forest on the fringe of which the species occurs, with an area of respect of at least 2 km^2. A moderate disturbance is needed to preserve the species from competition with shrub species, since *T. latinum* is a species of clearings and fringes. Regular mowing at intervals of three-four years should be performed in the stretch of white road where the species occurs, but ploughing and, in general, the passage of machines should be absolutely avoided. *Ex situ* conservation in the seed bank of the Botanical Garden of Rome should continue and germination tests should be carried out.

Giuliano Fanelli, Michele De Sanctis, Alessandro Serafini Sauli

Vicia incisa M.Bieb.

Regional assessment (Italy)
Taxonomy and nomenclature
Order: Fabales *Family*: Fabaceae.

Vicia incisa M.Bieb., Fl. Taur.-Caucas. 3: 471. 1819 ≡ *Vicia sativa* L. var. *incisa* (M.Bieb.) Boiss., Fl. Orient. 2: 574. 1872 ≡ *Vicia sativa* L. subsp. *incisa* (M.Bieb.) Arcang., Comp. Fl. Ital.: 201. 1882 = *Vicia pimpinelloides* Mauri, Roman. Pl. Cent. XIII: 35. 1820.

Figure 7. Flowering individual of *Vicia incisa* at Castelli Romani (Lazio, Italy). Pictures by M. Latini.

Common name: Veccia incisa (It), Incised vetch (En), Goroshek Nadrezannyi (Ru)

Geographic distribution range: *Vicia incisa* (Fig. 7) has a SE-Europe-Pontic distribution range. In Italy, the species occurs exclusively in two administrative regions: Lazio and Sicilia (Fig. 8). In Lazio, *V. incisa* is present only at Castelli Romani (Abbate et al. 2009, Anzalone et al. 2010). Here, the species was repeatedly collected at Albano Laziale and Castel Gandolfo in 1827 and 1854; later, it was not recorded for a long period and was re-discovered in the same sites only in 1982 (Anzalone 1983). During field surveys conducted in 2017, only two populations were observed at Castelli Romani along the road edges near chestnut woodlands, while a third population, growing in woodland clearings (P. Bassani, pers. comm.), was not recorded. The species was also cited by Mauri (1820) and by other Italian botanists (e.g., Arcangeli 1882) for Casetta Mattei (western areas of the city of Rome), but also this locality was not confirmed (Iberite et al. 2017). In Sicilia, the species occurs in Castiglione di Sicilia, where it was first discovered and collected in 1998 (Cristaudo and Margani 2005), but this population was not observed during field surveys in 2017; conversely, another population was discovered about 1 km away in the same municipality, on private land at C. Sangenisi.

Distribution: Countries of occurrence: Bulgaria, Crimea, Greece, Italy, Turkey.

Biology: *Plant growth form:* annual herb (therophyte). *Chromosome number:* $2n = 14$ (Roti Michelozzi and Barberis 1989; Meriç and Dane 1999).

Figure 8. Distribution map of *Vicia incisa* in Italy.

Flowering and fruiting time: Flowering from April to May, fruiting from May to June (in Italy).

Reproduction: Insect pollination, barochorus dispersion.

Habitat and Ecology: In Italy, *Vicia incisa* occurs at 300-600 m a.s.l. in clearings of deciduous oak/chestnut woodlands and along road margins on volcanic soils.

Population information: Italian populations are in decline: extinction events occurred both in historical (Casetta Mattei) and recent times (one population in Castelli Romani). There is no detailed information on population dynamics, but the number of mature plants can be estimated at about 100 individuals for both Castelli Romani and C. Sangenisi populations.

Threats: *1.1 Housing & Urban Areas:* the populations in Lazio are threatened by expansion of urban areas.

4.1 Roads & Railroads: in Lazio, the plants grow on the border or very close to roads, thus road management activities could have a negative impact.

7.3 Other ecosystem modifications: vegetation dynamics can cause habitat variations, which are unfavourable for this species; in Lazio, one population growing in clearings has disappeared probably due to the closure of the vegetation structure.

CRITERIA APPLIED:

Criterion B: **EOO:** 1,967 km^2 calculated with minimum convex hull in QGIS 2.14.10.
AOO: 16 km^2 calculated with a 2 × 2 km fixed cell grid.

a) Number of locations: three locations were identified according to the detected threats: Albano Laziale, Castel Gandolfo, and Castiglione di Sicilia.

b) Decline in quality and extent of habitat (iii); number of locations or subpopulations (iv); number of mature individuals (v).

Criterion D: Number of mature individuals < 250.

Red List category and Criteria (Regional Assessment):

EN	**Endangered**	**B1ab(iii,iv,v) + B2ab(iii,iv,v) + D**

Rationale for the assessment: In Italy, *Vicia incisa* is found exclusively in two regions (Lazio and Sicilia), with an EOO of 1,967 km^2 and an AOO of 16 km^2. Only three populations are currently known, two in Lazio and one in Sicilia. The total number of mature individuals is estimated at about 200. Because of its rarity, the decline in quality and extent of habitat and in the number of locations, combined with the low number of mature individuals, this taxon qualifies as EN Endangered. B1ab(iii,iv,v) + B2ab (iii,iv,v) + D in accordance with assessment reported above.

Previous assessment: Previously listed at national (Italy) level as CR (Rossi et al. 2013), while at a global level the species was not evaluated (IUCN 2017).

Conservation action: The populations at Castelli Romani occur within the Castelli Romani Regional Park; moreover, the population at Castel Gandolfo is included in SIC IT6030039 "Albano (Località Miralago)". The Sicilian population is not currently subject to any official protection measures, since its only stand does not fall within the nearby Etna Regional Park nor a SIC of the Natura 2000 network. However, it is located on private land, whose owner has been protecting it for several years from grazing and fires, which probably caused the disappearance of the other previously known station.

Conservation action needed: Research activities and monitoring programmes are recommended to better understand the population trends of the species; further field searches for other stations are also suggested.

Marta Latini, Gianluca Nicolella, Salvatore Cambria

Acknowledgements

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References

Abbate G, Bonacquisti S, Giovi E, Iamonico D, Iberite M, Lorenzetti R (2009) Contribution to the vascular flora of the Castelli Romani Regional Park (Rome, Central Italy) with recent observations and early herbarium surveys. Webbia 64(1): 47–74. https://doi.org/10.1080/00837792.2009.10670852

Anzalone B (1983) Note di flora romana: su alcune specie nuove o «ritrovate» nel Lazio. Informatore Botanico Italiano 15(1): 13–17.

Anzalone B, Iberite M, Lattanzi E (2010) La flora vascolare del Lazio. Informatore Botanico Italiano 42(1): 187–317.

Arcangeli G (1882) Compendio della Flora Italiana. Ermanno Loescher, Torino.

Bartolucci F, Peruzzi L, Galasso G, Albano A, Alessandrini A, Ardenghi NMG, Astuti G, Bacchetta G, Ballelli S, Banfi E, Barberis G, Bernardo L, Bouvet D, Bovio M, Cecchi L, Di Pietro R, Domina G, Fascetti S, Fenu G, Festi F, Foggi B, Gallo L, Gottschlich G, Gubellini L, Iamonico D, Iberite M, Jiménez-Mejías P, Lattanzi E, Marchetti D, Martinetto E, Masin RR, Medagli P, Passalacqua NG, Peccenini S, Pennesi R, Pierini B, Poldini L, Prosser F, Raimondo FM, Roma-Marzio F, Rosati L, Santangelo A, Scoppola A, Scortegagna S, Selvaggi A, Selvi F, Soldano A, Stinca A, Wagensommer RP, Wilhalm T, Conti F (2018) An updated checklist of the vascular flora native to Italy. Plant Biosystems 152(2): 179–303. https://doi.org/10.1080/11263504.2017.1419996

Brilli-Cattarini AJB, Gubellini L (1983) Segnalazioni Floristiche Italiane: 138. *Arceuthobium oxycedri* (DC.) Bieb. Informatore Botanico Italiano 13 (1981): 203.

Ciesla WM, Geils BW, Adams RP (2002) Hosts and geographic distribution of *Arceuthobium oxycedri*. RMRS-RN-11WWW. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. https://doi.org/10.2737/RMRS-RN-11

Conti F, Manzi A, Pedrotti F (1992) Libro rosso della flora d'Italia. Associazione Italiana per il World Wildlife Found, Roma.

Conti F, Manzi A, Pedrotti F (1997) Liste Rosse Regionali delle Piante d'Italia. World Wildlife Fund (WWF) Italia, Società Botanica Italiana (SBI), Centro Interdipartimentale Audiovisivi e Stampa, Università di Camerino. Camerino: Tipar Poligrafica Editrice. 1–139.

Cristaudo A, Margani I (2005) Specie nuove o interessanti per la Flora Siciliana. Informatore Botanico Italiano 37(2): 1153–1159.

Fanelli G, De Sanctis M, Serafini Sauli A (2012) La riscoperta di *Trifolium latinum* (Fabaceae) in Roma un secolo dopo la sua apparente sparizione dall'Italia. Informatore Botanico Italiano 44: 337–339.

Gonnelli V, Scarponi A (2003) Prima segnalazione di *Arceuthobium oxycedri (*DC) Bieb. in Romagna e nuovi dati distributivi in Italia. Quaderni di Studi e Notizie di Storia Naturale della Romagna 4: 1–6.

Hawksworth FG, Wiens D (1996) Dwarf mistletoes: Biology, pathology and systematic Agricultural Handbook 709. US Dept of Agriculture, Forest Service, Washington, DC, 410 pp. https://wwwfsfedus/rm/pubs_other/rmrs_1996_hawksworth_f001pdf

Hawksworth FG, Wiens D, Geils BW (2002) *Arceuthobium* in North America In: Geils BW, Cibrián TJ, Moody B (Eds) Mistletoes of North American Conifers Gen Tech Rep RMRS-

GTR-98. US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT, 29–56. https://wwwfsfedus/rm/pubs/rmrs_gtr098/rmrs_gtr098_029_056pdf

Iamonico D, Giovi E, Iberite M, Abbate G (2011) Typification of *Trifolium latinum* Sebast. (Fabaceae) and comparison with related species. Annales Botanici Fennici 48: 459–464. https://doi.org/10.5735/085.048.0603

Iberite M, Abbate G, Iamonico D (2017) *Vicia incisa* (Fabaceae): taxonomical and chorological notes. Annali di Botanica (Roma) 7: 57–65. https://doi.org/10.4462/annbotrm-13842

IUCN (2007) Participants of the FFI/IUCN SSC Central Asian regional tree Red Listing workshop, Bishkek, Kyrgyzstan (11–13 July 2006) 2007 *Arceuthobium oxycedri* The IUCN Red List of Threatened Species 2007: eT63518A12685664. http://dxdoiorg/102305/IUCNUK2007RLTST63518A12685664en

IUCN (2017) The IUCN Red List of threatened species. Version 2017-1. http://www.iucnredlist.org [accessed on 2017/07/27]

Koch MA (2012) Mid-Miocene divergence of *Ionopsidium* and *Cochlearia* and its impact on the systematics and biogeography of the tribe Cochlearieae (Brassicaceae). Taxon 61(1): 76–92.

Kozuharov SI (1976) *Trifolium* L. In: Jordanov D (Ed.) Flora Reipublicae Popularis Bulgaricae 6. Bulgarian Academy of Sciences, Sofia, 327–441.

Krasylenko YA, Janošíková K, Kukushkin OV (2017) Juniper dwarf mistletoe (*Arceuthobium oxycedri*) in the Crimean Peninsula: novel insights into its morphology, hosts, and distribution. Botany 95: 897–911. https://doi.org/10.1139/cjb-2016-0289

Lojacono-Poiero M (1888–1908) Flora sicula 1. Palermo.

Marcenò C, Colombo P, Princiotta R (1985) Ricerche climatologiche e botaniche sui Monti Sicani (Sicilia centro occidentale). Naturalista siciliano 4(8): 69–133.

Mauri E (1820) Romanarum Plantarum Centuria Decimatertia. Typis De Romanis, Romae. https://doi.org/10.5962/bhl.title.119540

Medagli P, Gambetta G (2003) Guida alla Flora del Parco. Parco Regionale della Murgia Materana, Matera, Italy.

Meriç Ç, Dane F (1999) Karyological studies on *Vicia sativa* L. subsp. *incisa* (Bieb.) Arc. var. *incisa*. Turkish Journal of Botany 23: 63–67.

Palanza A (1900) Flora della Terra di Bari. In: Jatta A (Ed.) La Terra di Bari, III. Tipografia Editore V. Vecchi, Trani, 1–90.

Perrino EV, Wagensommer RP, Silletti GN, Signorile G, Angiulli F (2013) Nuovi dati distributivi e relazione con la Direttiva 92/43/CEE di taxa critici pugliesi dalla Provincia di Bari. Informatore Botanico Italiano 45(1): 53–62.

Roti Michelozzi G, Barberis G (1989) Biosystematic notes on *Vicia incisa* M.Bieb. (Leguminosae), a rare species for Italy. Atti della Società Toscana di Scienze Naturali, Memorie, serie B 96: 219–225.

Sebastiani A (1813) Romanarum Plantarum fasciculus primus. Typis de Romanis, Romae.

Sebastiani E, Mauri A (1818) Florae Romanae Prodromus exhibens centurias XII plantarum circa Romam et in cisappenninis Pomntificiae Ditionis porvinciis sponte nascentium sexuali systemate digestas. Poggioli r.c.a., Roma, 351 pp.

Silletti NG (2013) Flora della Riserva Naturale Orientata "Murge Orientali". Corpo Forestale dello Stato. Ufficio Territoriale per la Biodiversità. Martina Franca. 121 pp.

Trotter A, Romano M (1914) Sulla Flora di Monte Crispiniano in Puglia. Nuovo Giornale Botanico Italiano n.s. 21(4): 398–435.

Zohary M (1970) *Trifolium* L. In: Davis PH (Ed.) Flora of Turkey and the East Aegean Islands. Vol. 3. Edinburgh university Press, Edinburgh, 645 pp.

Zohary M, Heller D (1984) The genus *Trifolium*. The Israel Academy of Sciences and Humanities, Jerusalem, 606 pp.